IN THE CLAIMS:

Claim 1-5 (Canceled)

6. (Original) A vapour compressor comprising:

a piston,

a cylinder,

said piston being reciprocable within said cylinder, the vibrating system of piston, spring and the pressure of said vapour having a natural frequency which varies with vapour pressure,

a linear brushless DC motor drivably coupled to said piston having at least one winding,

a DC power supply,

commutation means for electronically commutating said at least one winding from said DC supply to provide a supply of current to said at least one winding to reciprocate said piston,

resonant driving means which initiate commutation of said at least one winding to thereby drive said piston at the resonant frequency of said vibrating system,

current controlling means which determine the amount of said supply of current supplied by said commutation means, said determined amount of current being related to said resonant frequency, and which initiate commutation of said at least one winding to thereby limit the amplitude of reciprocation of said piston.

7. (Original) A vapour compressor as claimed in claim 6 further comprising:

a sensor for measuring a property of the vapour entering the compressor which is an indicator of the pressure,

and wherein said determined amount of current also being related to said measured indicative property.

8. (Original) A vapour compressor as claimed in claim 7 wherein said sensor measures a property of the vapour entering the compressor which is an indicator of the pressure on evaporation.

9. (Original) A vapour compressor as claimed in any one of claims 6 to 8 wherein said resonant driving means comprising:

back EMF detection means for sampling the back EMF induced in said at least one winding when commutation current is not flowing and for detecting back EMF zero-crossings and producing timing signals derived therefrom, and

resonant commutation means which initiate commutation of said at least one winding in response to said zero crossing timing signals to thereby drive said piston at the resonant frequency of said vibrating system.

10. (Original) A vapour compressor as claimed in claim 9 further comprising:

current detection means for measuring the current flowing in said at least one winding during commutation,

wherein said current controlling means terminates commutation when said measured current reaches said determinated amount of current.

11. (Original) A vapour compressor as claimed in claim 10 wherein said commutation means includes switching devices connected to said DC power supply to supply current to said at least one winding and unidirectional current devices which supply a current path to dissipate energy stored in each winding after supply of current through a switching device has terminated, and said current detection means comprises:

a programmed digital processor including memory and input-output ports, a first port being connected to the output of said back EMF detection means and a second group of ports being connected to said commutation means to supply switching control signals thereto,

software stored in said memory to cause said processor to determine a measure of motor current based on intervals between those zero crossings of said back EMF, which represent the duration of a current pulse produced in said at least one winding due to dissipation of stored energy by said unidirectional current devices after supply of current has been removed from said at least one winding.

12. (Currently Amended) A vapour compressor as claimed in any one of claims 6 to ~~11~~ 8 wherein said current controlling means further comprises:

means for measuring said resonant frequency,

a memory which stores at least one look up table containing maximum current commutation values for each of a plurality of resonant frequencies for said vibrating system, and

value selection means for selecting the value in said table which corresponds to said measured resonant frequency and for supplying same to said commutation controlling means.

13. (Original) A vapour compressor as claimed in either claims 7 or 8 wherein said current controlling means further comprising:

means for measuring said resonant frequency,

a memory which stores a plurality of look up tables stored in said memory containing maximum current commutation values for each of a plurality of resonant frequencies for said vibrating system, each look up table corresponding to a non-overlapping range of said indicative property, and

table selection means for selecting a look up table to use on the basis of the measured value of said indicative property,

value selection means for selecting the value in said table which corresponds to said measured resonant frequency and for supplying same to said commutation controlling means.

14. (Currently Amended) A vapour compressor as claimed in any one of claim 6 to ~~11~~ 8 wherein said current controlling means includes a processor storing instructions which when executed calculate said determined amount of current based on a mathematically expressible relationship to at least said measured resonant frequency and optionally said measured indicative property.

Claims 15-22 (Canceled)

23. (Original) A vapour compressor according to claim 6 wherein instead of said piston and said cylinder said compressor is a diaphragm type compressor.

24. (Canceled)

25. (New) A vapour compressor as claimed in claim 9 wherein said current controlling means further comprises:

means for measuring said resonant frequency,

a memory which stores at least one look up table containing maximum current commutation values for each of a plurality of resonant frequencies for said vibrating system, and

value selection means for selecting the value in said table which corresponds to said measured resonant frequency and for supplying same to said commutation controlling means.

26. (New) A vapour compressor as claimed in claim 10 wherein said current controlling means further comprises:

means for measuring said resonant frequency,

a memory which stores at least one look up table containing maximum current commutation values for each of a plurality of resonant frequencies for said vibrating system, and

value selection means for selecting the value in said table which corresponds to said measured resonant frequency and for supplying same to said commutation controlling means.

27. (New) A vapour compressor as claimed in claim 11 wherein said current controlling means further comprises:

means for measuring said resonant frequency,

a memory which stores at least one look up table containing maximum current commutation values for each of a plurality of resonant frequencies for said vibrating system, and

value selection means for selecting the value in said table which corresponds to said measured resonant frequency and for supplying same to said commutation controlling means.

28. (New) A vapour compressor as claimed in claim 9 wherein said current controlling means includes a processor storing instructions which when executed calculate said determined amount of current based on a mathematically expressible relationship to at least said measured resonant frequency and optionally said measured indicative property.

29. (New) A vapour compressor as claimed in claim 10 wherein said current controlling means includes a processor storing instructions which when executed calculate said determined amount of current based on a mathematically expressible relationship to at least said measured resonant frequency and optionally said measured indicative property.

30. (New) A vapour compressor as claimed in claim 11 wherein said current controlling means includes a processor storing instructions which when executed calculate said determined amount of current based on a mathematically expressible relationship to at least said measured resonant frequency and optionally said measured indicative property.